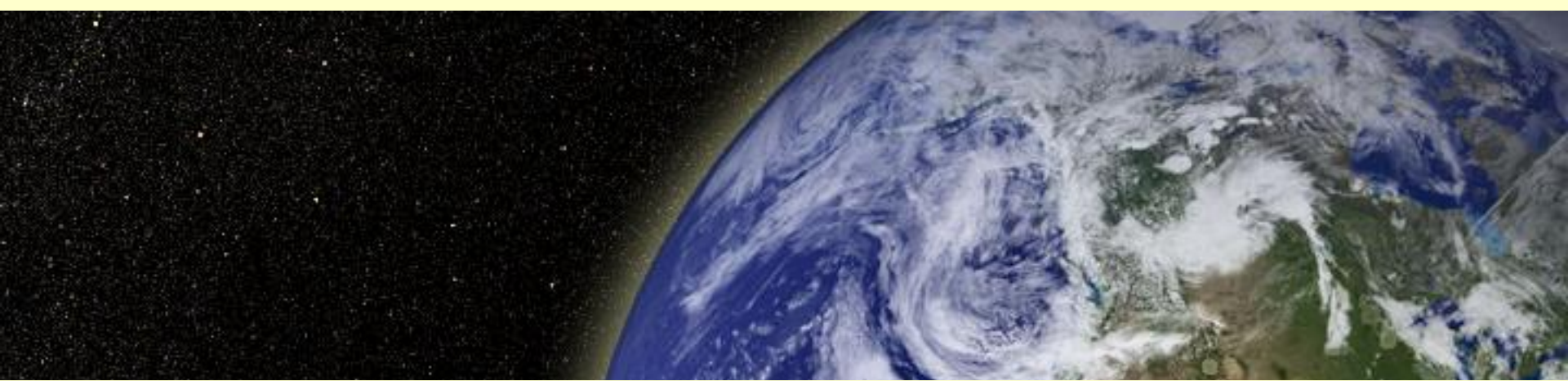


GOES Land Line Data Distribution: Present and Future



Tom Renkevans – Office of Satellite and Product Operations
Reginald Lawrence – Office of Systems Development

NOAA / NESDIS
January 25, 2011

91st AMS Annual Meeting, Seattle, WA

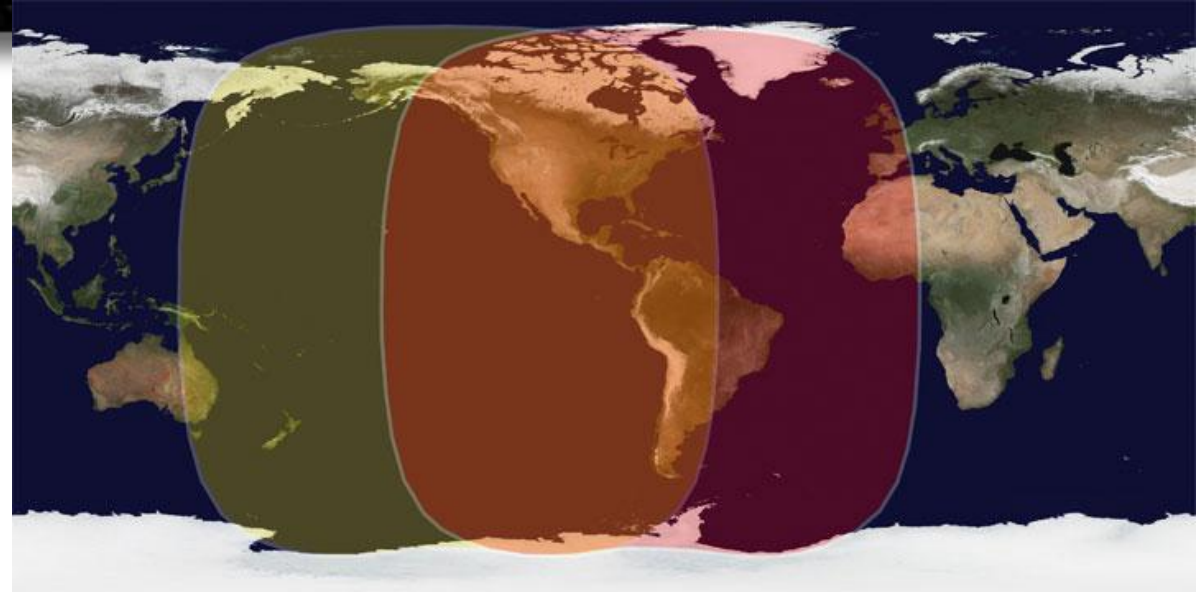
7th Seventh Annual Symposium on Future Operational Environmental Satellite Systems, 4.3



Agenda

- 🌐 Current GOES Status and Activities
- 🌐 Current GOES Data Flow
- 🌐 Current GOES Data Distribution Services
 - 🌐 Land Line
 - 🌐 Broadcast
- 🌐 Future GOES Data Distribution
 - 🌐 Broadcast
 - 🌐 Land Line via PDA
- 🌐 Future Opportunities
- 🌐 Summary

Geostationary Satellites (GOES)

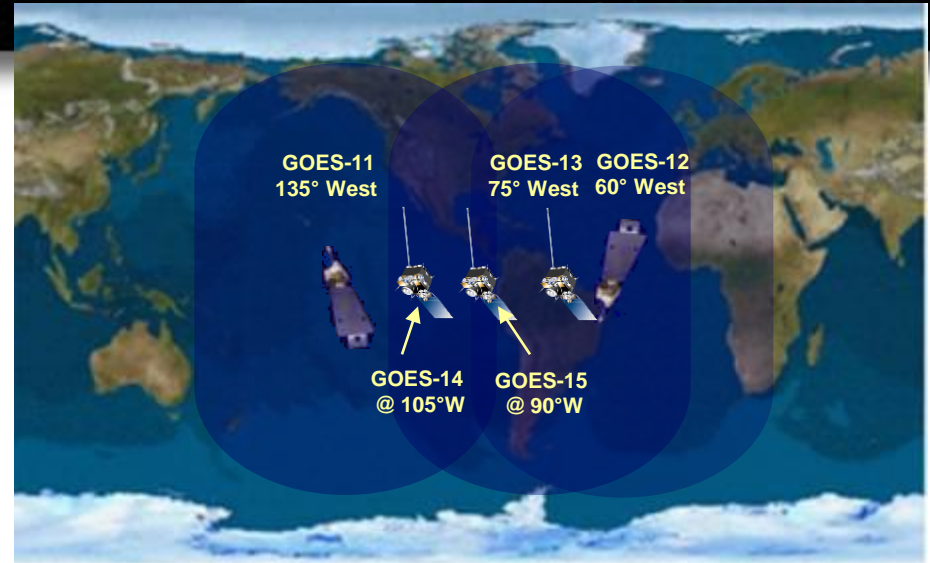
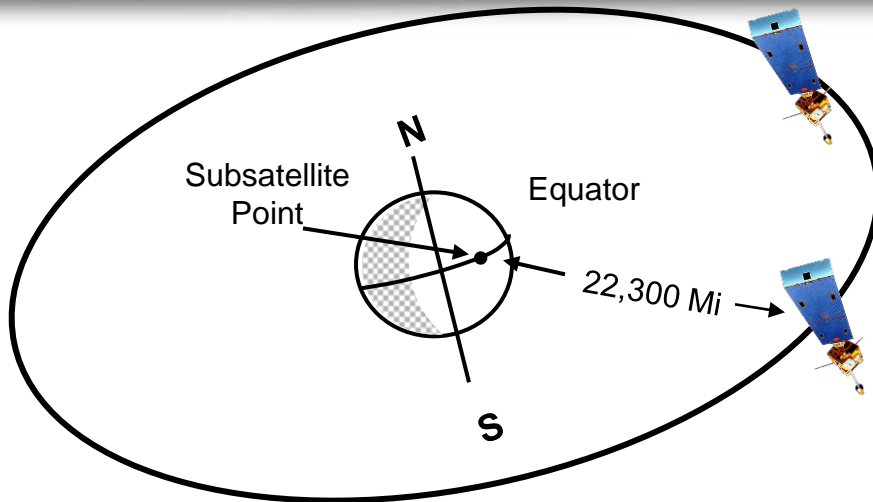


- 35,800 km high
- Two Satellite System continuously monitors the Western Hemisphere
- Northern Hemisphere Imaged every 15 minutes

- Weather sentinel – constant monitoring of Hurricanes, Severe Storms, and more
- Input to weather models, forecasts, and warnings
- Sea surface temperature monitoring for fisheries and climate
- Winds for aviation
- Solar imagery for communication satellites, utility companies, and astronaut safety
- Environmental data collection from buoys, stream gauges, etc.
- Satellite-aided Search and Rescue

GOES Constellation

Primary Requirement: Continuity of Capability



GOES I-M (8-12) series operational since 1994

- 🌐 GOES-10 deorbited - was at 60° W in support of South America December 2, 2006 – December 1, 2009
- 🌐 GOES-11 operational as GOES West at 135° W - June 21, 2006
- 🌐 GOES-12 providing coverage of South America at 60°W - May 11, 2010

GOES N/O/P (13/14/15)

- 🌐 GOES-13 operational as GOES-East at 75° W – April 14, 2010
- 🌐 GOES-14 in Z-axis storage at 105° W – launched June 27, 2009
- 🌐 GOES-15 in earth pointing 'storage' at 90°W with space instruments on - launched March 4, 2010



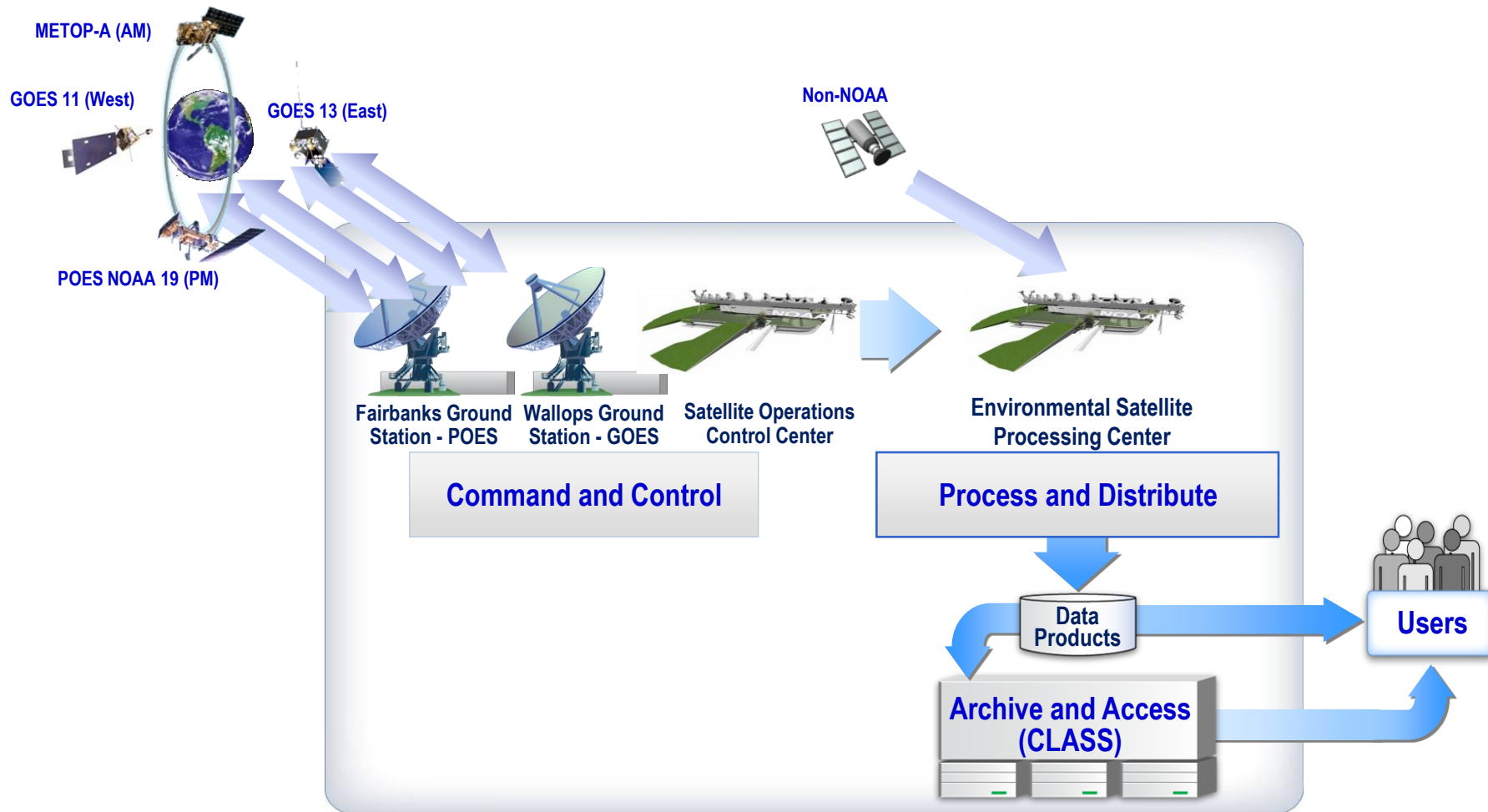
Upcoming GOES Activities

- 🌐 GOES West Replacement
 - 🌐 GOES-14 or GOES-15
 - pros and cons
 - 🌐 Date – likely late 2011
- 🌐 Shifted Frame Support for GOES-East Spring Eclipse period, similar to this past fall eclipse
 - 🌐 Potential consideration for similar support for GOES-West in the future
- 🌐 Stray Light Correction for GOES-N/O/P Series
 - 🌐 Contamination of data from stray light largely surrounding equinoxes
 - 🌐 Studies conducted
 - 🌐 Way forward?

See me (Thomas.Renkevans@noaa.gov) for discussions, questions, comments.



Satellite Information Flow





Satellite Operations: Command and Control

24-hour Operations for GOES and Polar Systems

Photo Courtesy of: Michael A. Stewart



Functions include:

- 🌐 Orbit Determination
- 🌐 Spacecraft Navigation
- 🌐 Data Acquisition
- 🌐 Engineering
- 🌐 Commanding GOES to perform special image acquisition
 - 🌐 “Rapid scan” of a hurricane or major storm
- 🌐 24-hour mission control center for search and rescue



Satellite Data Processing and Distribution

24-hour Operational Support for Severe Weather and Environmental Forecasting

Near-Real-Time Products For the User

Sample of Operational Products

- Atmospheric Temperature and Moisture Profiles
- Winds
- Fire Detection
- Gridded Images of Clouds and Moisture
- Vegetation Index
- Measure Solar Radiation
- Volcanic Detection
- Sea Surface Temperature
- Snow and Ice Cover

Environmental Monitoring

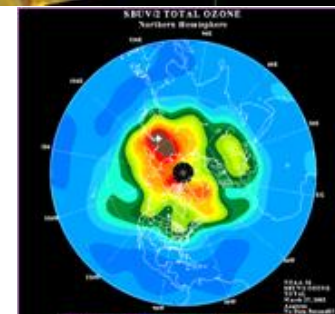
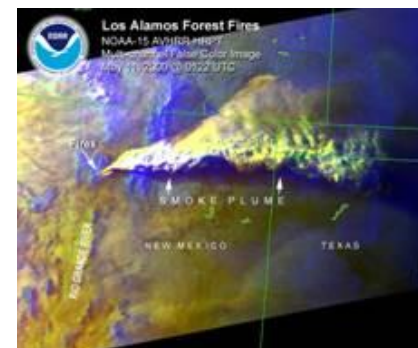
- Ozone Data and Products
- Oil Spill

Distribution Services

- Distribution of NOAA satellite data sets via satellite rebroadcasting and other communications means
- NOAA uses data from NASA, DoD, and European satellites

User Services

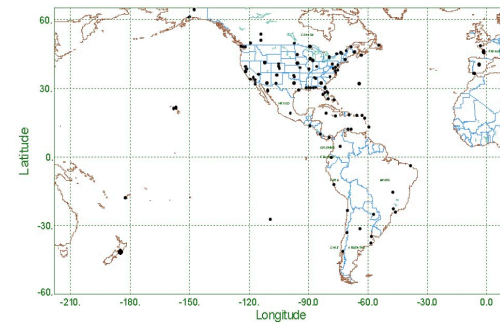
- Interface between NESDIS and the user community.
- Manages the direct services (DCS, Argos) and the Search and Rescue system (SARSAT)





Direct Readout Services

- **GOES Broadcast:**
 - *GVAR – GOES Variable*
 - The GVAR is a combination of imager and sounder (scaled) radiances (no products), Downlink 2.11 Mbps 1685.7 MHz
 - *MDL – Multi-Use Data Link*
 - Space and Solar instrument data, Downlink 1681.5 MHz
- *NOAAPORT Satellite Broadcast Network (SBN) (AWIPS)*
 - Subset of NESDIS Satellite Imagery and Products are available



Wallops CDA – Wallops, VA



SSEC – Madison, WI

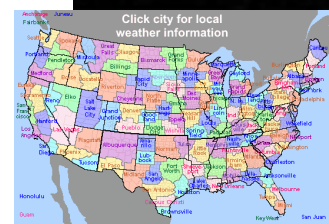


Direct Readout Services

Emergency Managers Weather Information Network (EMWIN):

🌐 NOAA satellites relay critical information to users across the country.

🌐 <http://www.weather.gov/emwin/index.htm>



Low Resolution Image Transmission (LRIT):

🌐 NOAA satellites are used to relay satellite and weather products to users in remote locations, that do not have landlines or internet connections.

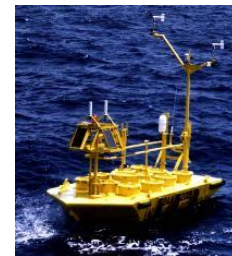
🌐 <http://www.noaasis.noaa.gov/LRIT/>



Data Collection:

🌐 NOAA satellites are used to collect and relay scientific data from around the globe.

🌐 <http://www.noaasis.noaa.gov/DCS/>
<http://www.noaasis.noaa.gov/ARGOS/>



Search and Rescue:

🌐 NOAA satellites are used to relay distress alerts from aviators, mariners and land-based users.

🌐 <http://www.sarsat.noaa.gov/>



GOES-R Ground Segment



Broadcast Services Continue, at increased data and information rates!



Enterprise Data Delivery Solution

Decision made to incorporate landline distribution and access functionality within an enterprise solution:

Product Distribution and Access (PDA)

- 🌐 Identify PDA enterprise and project-unique requirements from the comprehensive set of the legacy, GOES-R, and NDE requirements
- 🌐 Capture project schedule needs and constraints (e.g., reviews, integration and test, operational capability)

Derived enterprise PDA services

- 🌐 Receive Data (push and pull)
- 🌐 Route Data (to users and storage)
- 🌐 Distribute Data (includes user interface)
- 🌐 Store Data (internal short term and interface to CLASS)
- 🌐 Support Data Exploitation (additional external processing of data)

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Enterprise Data Delivery Solution

System acquisition planned through the NESDIS Office of System Development (OSD) Environmental Satellite Processing and Distribution System (ESPDS) Development contract

Solers

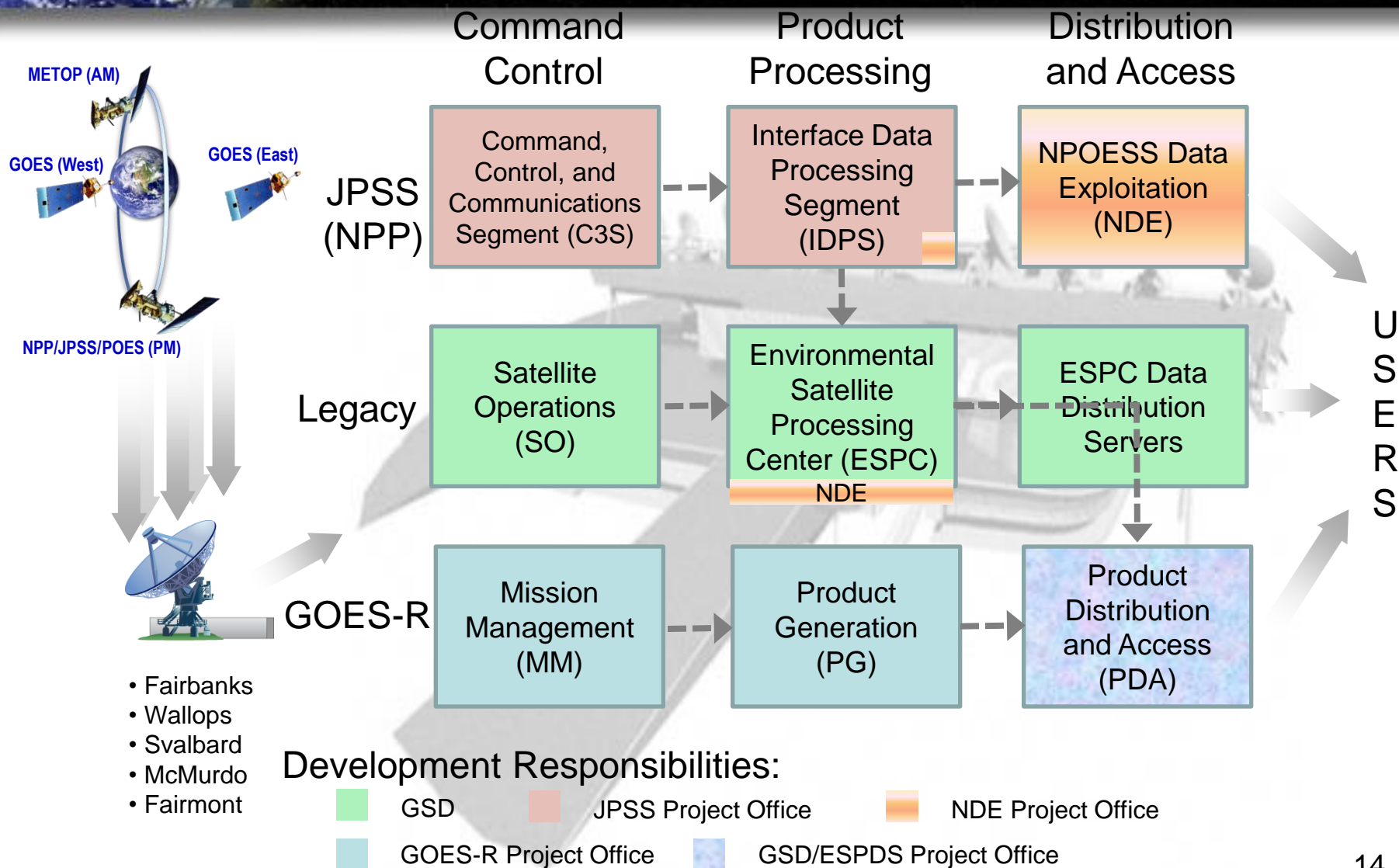
-  I. M. Systems Group Inc
-  INNOVIM
-  SMRC
-  ASRC Aerospace Corporation
-  Lockheed Martin

 *Additional Information on Future Satellite Data Distribution:*

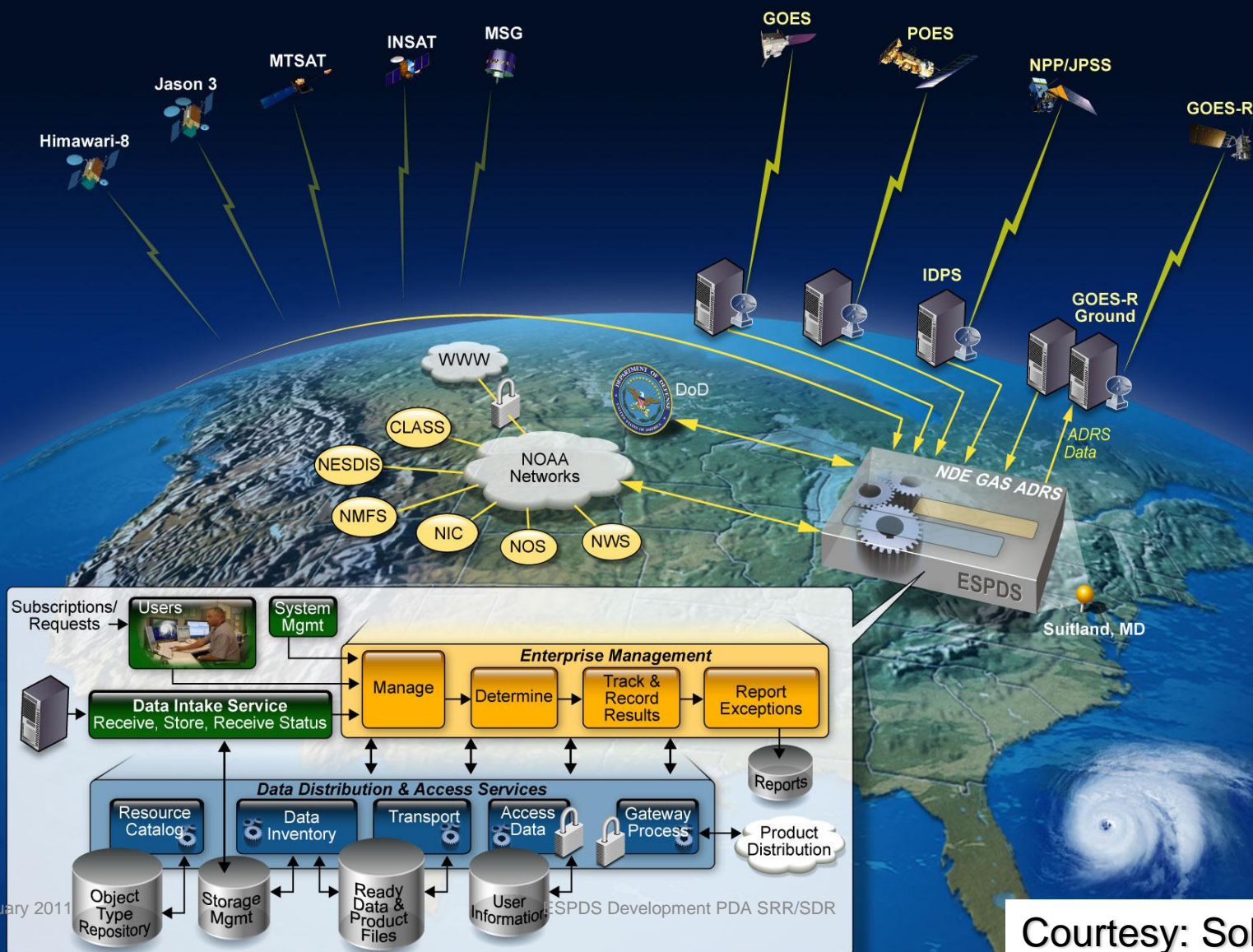
 *Thursday 2:15pm, part of IIPS, paper 13A.4, Room 606*



NESDIS Satellite and Product Ground Systems Operations



ESPDS System Overview





Future Opportunities

NOAA's Satellite Direct Readout Conference

 Miami, FL April 4-8

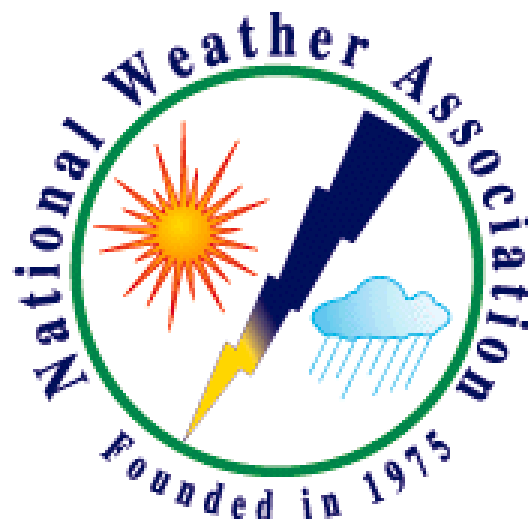
 <http://directreadout.noaa.gov/miami11/>

- Registration now open

7th GOES Users' Conference (with NWA)

 Birmingham, Alabama

 October 15-21





Summary

Current GOES Constellation is healthy, and data are made available to users in a variety of ways.

With the upcoming GOES-R series and an expected large increase of data, plans are actively underway for delivery of such data to users.

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